

## Claims

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71. A representative sample generating apparatus for generating representative sample data of each of a plurality of groups, based on a plurality of sample data initially classified into said plural groups, said apparatus comprising:

group feature data detection means for detecting group feature data representing feature of sample data in each of said groups,

distance detection means for detecting the distances between all of the sample data and the group feature data of each group;

re-classification means for re-classifying all of said sample data into said plural groups based on said distances;

convergence detection means for detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification means; and

decision means for repeating the processing by said group feature data detection means, re-classification means and said convergence detection means until said convergence detection means has detected convergence, and for determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection means as representative sample data of each group.

2. The representative sample generating apparatus according to claim 1

wherein

said group feature data detection means detects an average value of sample data

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- wherein

said convergence detection means detects convergence when the number of the data classified into a group different from the previous group is equal to or greater than a pre-set number.

- wherein

said distance detection means detects the distance by calculating the correlation group feature data of each group with respect to all of sample data.

- wherein

said sample data is image data.

- wherein

said group feature data detection means generates group feature data according orientation of an image represented by image data.

- representative sample generating method for generating representative sample of each of a plurality of groups, based on a plurality of sample data initially divided into said plural groups, said method comprising:

a step of detecting group feature data representing feature of sample data in

each of said groups,

a step of detecting the distances between all of the sample data and the group feature data of each group;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification step; and

a step of repeating the processing by said group feature data detection step, re-classification step and said convergence detection step until said convergence detection step has detected convergence, and for determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection step as representative sample data of each group.

8. A recording medium having recorded thereon a computer-controllable program for generating representative sample data of each of a plurality of groups, based on a plurality of sample data initially classified into said plural groups, said program comprising:

a step of detecting group feature data representing feature of sample data in each of said groups,

a step of detecting the distances between all of the sample data and the group feature data of each group;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification step; and

a step of repeating the processing by said group feature data detection step, re-classification step and said convergence detection step until said convergence detection step has detected convergence, and for determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection step as representative sample data of each group.

9. A representative sample generating apparatus for generating representative sample data of each of a plurality of groups by classifying said plural sample data, having appended supplementary data indicating respective feature, into said plural groups, said apparatus comprising:

initial classification means for initially classifying said plural sample data into plural groups, based on said supplementary data;

group feature data detection means for detecting group feature data representing feature of said sample data in each of said groups;

distance detection means for detecting the distances between all of the sample data and the group feature data of each group;

re-classification means for re-classifying all of said sample data into said plural

groups based on said distances;

convergence detection means for detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification means; and

decision means for repeating the processing by said group feature data detection means, said re-classification means and the convergence detection means until said convergence detection means has detected convergence, and for determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection means as representative sample data of each group.

10. The representative sample generating apparatus according to claim 9

wherein

said group feature data detection means detects an average value of sample data in each group as said group feature data.

11. The representative sample generating apparatus according to claim 9

wherein

said convergence detection means detects convergence when the number of sample data classified into a group different from the previous group is equal to or smaller than a pre-set number.

12. A representative sample generating method for generating representative sample data of each of a plurality of groups by classifying said plural sample data, having appended supplementary data indicating respective feature, into said plural groups,

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said method comprising:

a step of initially classifying said plural sample data into plural groups, based on said supplementary data;

a step of detecting group feature data representing feature of said sample data in each of said groups;

a step of detecting the distances between all of the sample data and the group feature data of each group;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification step; and

a step of repeating the processing by said group feature data detection step, said re-classification step and the convergence detection step until said convergence detection step has detected convergence, and of determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection step as representative sample data of each group.

13. A recording medium having recorded thereon a computer-controllable program for generating representative sample data of each of a plurality of groups by classifying said plural sample data, having appended supplementary data indicating respective feature, into said plural groups, said program comprising:

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a step of repeating the processing by said group feature data detection step, said re-classification step and the convergence detection step until said convergence detection step has detected convergence, and of determining the group feature data of each group prevailing at the time of said convergence as detected by said convergence detection step as representative sample data of each group.

distance detection means for detecting the distances between all of the sample

data and the group feature data of each group;

re-classification means for re-classifying all of said sample data into said plural groups based on said distances;

convergence detection means for detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification means; and

decision means for repeating the processing by said group feature data detection means, said re-classification means and the convergence detection means until said convergence detection means has detected convergence, and for determining the results of re-classification of each sample data by said re-classification means on convergence detection by said convergence detection means.

15. A classification method for re-classifying sample data initially classified into a plurality of groups, said method comprising:

a step of detecting group feature data representing feature of the sample data for each of said groups;

a step of detecting the distances between all of the sample data and the group feature data of each group;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by





classification of each sample data by said re-classification step on convergence detection in said convergence detection step as ultimate results of classification of each of said groups.

17. A classification apparatus for classifying plural sample data, having appended supplementary data indicating respective feature, into plural groups, said apparatus comprising:

initial classification means for initially classifying said plural sample data into plural groups, based on said supplementary data;

group feature data detection means for detecting group feature data representing feature of said sample data in each of said groups;

distance detection means for detecting the distances between all of the sample data and the group feature data of each group;

re-classification means for re-classifying all of said sample data into said plural groups based on said distances;

convergence detection means for detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification means; and

decision means for repeating the processing by said group feature data detection means, said re-classification means and the convergence detection means until said convergence detection means has detected convergence, and for determining the results of re-classification of each sample data by said re-classification means on

convergence detection in said convergence detection step as ultimate results of classification of each of said groups.

18. A classification method for classifying plural sample data, having appended supplementary data indicating respective feature, into plural groups, said method comprising:

a step of initially classifying said plural sample data into plural groups, based on said supplementary data;

a step of detecting group feature data representing feature of said sample data in each of said groups;

a step of detecting the distances between all of the sample data and the group feature data of each group;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of detecting whether or not the number of sample data classified into groups different from previous groups is converged as a result of re-classification by said re-classification step; and

a step of repeating the processing by said group feature data detection step, said re-classification step and the convergence detection step until said convergence detection step has detected convergence, and of determining the results of re-classification of each sample data by said re-classification step on convergence detection in said convergence detection step as ultimate results of classification of

19. A recording medium having recorded thereon a computer-controllable program for classifying plural sample data, having appended supplementary data indicating respective feature, into plural groups, said program comprising:

a step of detecting group feature data representing feature of said sample data in each of said groups;

a step of re-classifying all of said sample data into said plural groups based on said distances;

a step of repeating the processing by said group feature data detection step, said re-classification step and the convergence detection step until said convergence detection step has detected convergence, and of determining the results of re-classification of each sample data by said re-classification step on convergence detection in said convergence detection step as ultimate results of classification of each of said groups.

20. A coefficient data generating apparatus for generating a coefficient data set adapted for generating sample feature data from new sample data not having sample feature data, based on a database in which there are pre-stored said sample feature data and sample data associated with said sample feature data, said apparatus comprising:

classification means for classifying said sample data into a plurality of classes, based on the relation thereof with representative sample data which is set to each classification and which is associated with the sample feature data;

means for generating, for each class, a normal equation having the values of the sample feature data and the sample data as previously known data and having coefficient data as unknown data; and

coefficient data generating means for solving said normal equation for each class to generate said coefficient data set for each class.

21. A coefficient data generating method for generating a coefficient data set adapted for generating sample feature data from new sample data not having sample feature data, based on a database in which there are pre-stored said sample feature data and sample data associated with said sample feature data, said method comprising:

a step of classifying said sample data into a plurality of classes, based on the relation thereof with representative sample data which is set to each classification and which is associated with the sample feature data;

a step of generating, for each class, a normal equation having the values of the sample feature data and the sample data as previously known data and having

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coefficient data as unknown data; and

a step of solving said normal equation for each class to generate said coefficient data set for each class.

22. A recording medium having recorded thereon a computer-controllable program adapted for generating a coefficient data set adapted for generating sample feature data from new sample data not having sample feature data, based on a database in which there are pre-stored said sample feature data and sample data associated with said sample feature data, said program comprising:

a step of classifying said sample data into a plurality of classes, based on the relation thereof with representative sample data which is set to each classification and which is associated with the sample feature data;

a step of generating, for each class, a normal equation having the values of the sample feature data and the sample data as previously known data and having coefficient data as unknown data; and

a step of solving said normal equation for each class to generate said coefficient data set for each class.

23. A sample feature data generating apparatus comprising:

distance detection means for detecting distance between input sample data and each representative sample data generated previously for each of a plurality of groups;

classification means for classifying said input sample data into one of said classes, based on the distances of said input sample data from representative sample

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data of said plural groups; and

sample feature data generating means for generating sample feature data representing the feature of said input sample data in accordance with a system pre-set for each class.

24. The sample feature data generating apparatus according to claim 23

wherein

said sample feature data generating means includes

storage means for storing a coefficient data set pre-set for each class;

prediction equation generation generating means for generating a prediction equation based on the coefficient data set read out from said storage means based on a class determined by said classification means; and

data generating means for solving said prediction equation to generate said sample feature data.

25. The sample feature data generating apparatus according to claim 23

wherein

said sample feature data generating means generates sample feature data having consecutive values on a line interconnecting said plural representative sample data.

26. The sample feature data generating apparatus according to claim 23

wherein

said distance detection means detects a distance by calculating the correlation between input sample data and representative sample data generated at the outset for

each of said groups.

27. The sample feature data generating apparatus according to claim 23

wherein

said input sample data is image data.

28. The sample feature data generating apparatus according to claim 27

wherein

said sample feature data generating means generates sample feature data according to the orientation of an image represented by image data.

29. A sample feature data generating method comprising:

a step of detecting distance between input sample data and each representative sample data generated previously for each of a plurality of groups;

a step of classifying said input sample data into one of said classes, based on the distances of said input sample data from representative sample data of said plural groups; and

a step of generating sample feature data representing the feature of said input sample data in accordance with a system pre-set for each class.

30. A recording medium having recorded thereon a computer-controllable program adapted for generating sample feature data representing feature of input sample data, said program comprising:

a step of detecting distance between input sample data and each representative sample data generated previously for each of a plurality of groups;



a step of classifying said input sample data into one of said classes, based on the distances of said input sample data from representative sample data of said plural groups; and

a step of generating sample feature data representing the feature of said input sample data in accordance with a system pre-set for each class.

31. A data processing apparatus comprising:

a representative sample generating device adapted for repeatedly performing the operations of detecting group feature data based on a plurality of sample data initially classified into a plurality of groups, said group feature data representing feature of sample data in each of said groups, detecting distances between all of the sample data and the group feature data of each group, re-classifying all of said sample data into said plural groups, based on the detected distance, and detecting whether or not the number of sample data classified into groups different from the previous groups has converged, and for determining the group feature data of each group prevailing on detection of the convergence by said re-classification of the number of sample data classified into groups different from the previous group, as representative sample data of each group; and

a sample feature data generating device adapted for detecting the distances of input sample data to representative sample data of each group, classifying said input sample data into one of a plurality of classes, based on the distances of said input sample data to the representative sample data of each group, and for generating sample

feature data representing feature of said input sample data in accordance with a system pre-set for each class.

32. A data processing method comprising:

a representative sample data determining step of repeatedly performing the operations of detecting group feature data based on a plurality of sample data initially classified into a plurality of groups, said group feature data representing feature of sample data in each of said groups, detecting distances between all of the sample data and the group feature data of each group, re-classifying all of said sample data into said plural groups, based on the detected distance, and detecting whether or not the number of sample data classified into groups different from the previous groups has converged, and for determining the group feature data of each group prevailing on detection of the convergence by said re-classification of the number of sample data classified into groups different from the previous group, as representative sample data of each group; and

a sample feature data generating step of detecting the distances of input sample data to representative sample data of each group, classifying said input sample data into one of a plurality of classes, based on the distances of said input sample data to the representative sample data of each group, and for generating sample feature data representing feature of said input sample data in accordance with a system pre-set for each class.

33. A recording medium having recorded thereon a computer-controllable program

adapted for performing the processing of generating sample feature data representing feature of input sample data, said program comprising:

a representative sample data determining step of repeatedly performing the operations of detecting group feature data based on a plurality of sample data initially classified into a plurality of groups, said group feature data representing feature of sample data in each of said groups, detecting distances between all of the sample data and the group feature data of each group, re-classifying all of said sample data into said plural groups, based on the detected distance, and detecting whether or not the number of sample data classified into groups different from the previous groups has converged, and determining the group feature data of each group prevailing on detection of the convergence by said re-classification of the number of sample data classified into groups different from the previous group, as representative sample data of each group; and

a sample feature data generating step of detecting the distances of input sample data to representative sample data of each group, classifying said input sample data into one of a plurality of classes, based on the distances of said input sample data to the representative sample data of each group, and of generating sample feature data representing feature of said input sample data in accordance with a system pre-set for each class.